

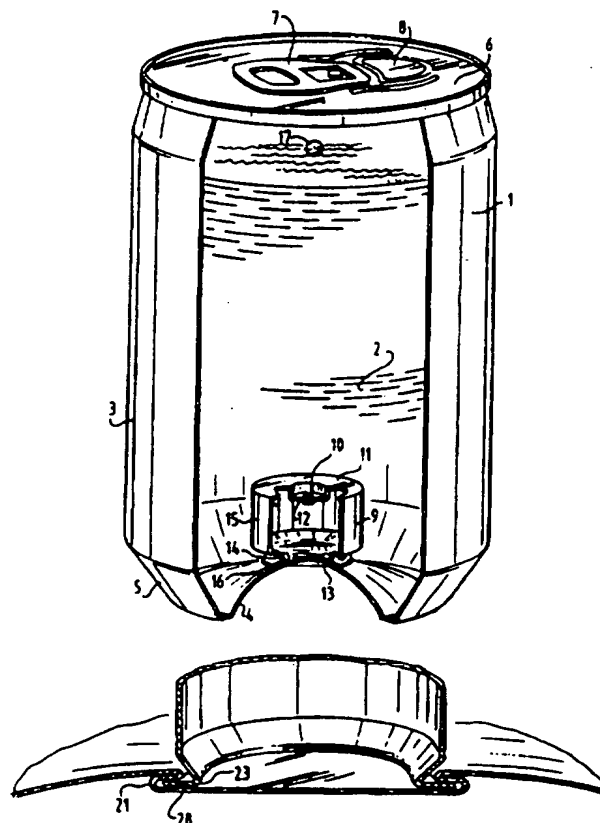


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/NL96/00142 <b>(22) International Filing Date:</b> 3 April 1996 (03.04.96)  <b>(30) Priority Data:</b> 1000067                      5 April 1995 (05.04.95)                      NL  <b>(71) Applicant (for all designated States except US):</b> THOMASSEN & DRIJVER-VERBLIFA N.V. [NL/NL]; Zuphenseweg 51051, NL-7418 AH Deventer (NL).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BRILMAN, Gerrit, Willem [NL/NL]; Burgemeester Bogtstralaan 3, NL-7418 AH Deventer (NL). STRUBE, Lutz [DE/DE]; Eckernkampstrasse 4, D-38162 Schandelah (DE). BAST, Bert [DE/DE]; Bleekenweg 14, D-38162 Cremlingen/Weddel (DE).  <b>(74) Agent:</b> SCHUMANN, Bernard, Herman, Johan; Arnold & Siedsma, Sweelinckplein 1, NL-2517 GK The Hague (NL).		<b>(81) Designated States:</b> AU, HU, JP, MX, PL, TR, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Dutch).</i>

**(54) Title:** BEER CONTAINER**(57) Abstract**

A metal container (19) for beer comprises: a wall formed into a closed contour; a base (18) which is connected along its whole periphery to this wall; optionally a cover which is arranged on the side remote from the base after filling of the container with beer and which is connected along its whole periphery to this wall; and a cartridge (22) which is coupled to the base and extends from the base over some axial distance and which defines two passages, the first (32) of which is situated in an end wall of the cartridge remote from the base and the second of which is situated in the region of the base; which cartridge has the general shape of a beaker, which beaker is coupled with the edge zone (23) of its mouth to the base (18) of the container by means of coupling means. The container according to the invention has the feature that the coupling means (21, 28) are exclusively mechanical and are embodied such that between the edge zone (23) of the cartridge and the base (18) of the container there remains some space, which space defines the second passage. It should be understood that the cartridge can be fixed more or less loosely to the base.



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# BEER CONTAINER

The invention relates to a metal container for beer comprising:

a wall formed into a closed contour;

a base which is connected along its whole  
5 periphery to this wall;

optionally a cover which is arranged on the side remote from the base after filling of the container with beer and which is connected along its whole periphery to this wall; and

10 a cartridge which is coupled to the base and extends from the base over some axial distance and which defines two passages, the first of which is situated in an end wall of the cartridge remote from the base and the second of which is situated in the region of the base;

15 which cartridge has the general shape of a beaker, which beaker is coupled with the edge zone of its mouth to the base of the container by means of coupling means.

Such a container is known.

20 Such a container is filled with beer by the beer supplier, whereafter a drop of liquid nitrogen is deposited on the surface, following which the container is then rapidly closed with the cover. The liquid nitrogen evaporates and an overpressure is created in the  
25 can. By turning over the can, thus such that the base is situated at the top, the gas under pressure enters the cartridge. After the can has been turned over again, the gas remains behind in the cartridge since the first passage is so narrow that due to the capillary action the  
30 beer cannot pass through the aperture. Due to the presence of equal pressure in the whole container the cartridge remains at least for the greater part filled with gas under pressure. Only after opening of the

container, for instance by removing the cover or tearing loose a pull tab, does the gas tend to escape and will do so via the first aperture. This is so narrow that a flow of small nitrogen bubbles will be displaced through the beer, thereby resulting in a stiff foam of very good quality.

The known container is embodied such that the coupling means comprise a gluing surface, whereby the cartridge is adhered with a bottom surface to the base of the container.

The use of glue has a number of drawbacks. For legal reasons only very few glue types can be employed for foodstuffs. There is the further danger that a glue will affect the flavour of beer. In respect of production technique, a drawback of using glue is that it requires a specific operation and that glue needs time to harden.

With a view to the above the invention proposes a beer container which has the feature that the coupling means are exclusively mechanical and are embodied such that between the edge zone of the cartridge and the base of the container there remains some space, which space defines the second passage.

It should be understood that the cartridge is fixed more or less loosely to the base.

A particular embodiment has the special feature that the base has an axially displaced part having an at least partly undercut peripheral zone; and

the edge zone takes an at least partly undercut form;

which peripheral zone and which edge zone mutually engage while retaining a clearance such that the cartridge is coupled to the base.

A very simple embodiment has the special feature that the coupling means comprise snap means. In this embodiment the cartridge can be snap-coupled to the base by a simple snapping operation and by overcoming a snapping force determined by the dimensioning parameters.

Another embodiment, which implies the advantage of a slightly greater control but the drawback of an additional process step, has the feature that at least one of the peripheral zone and the edge zone is  
5 compressed at least partially in axial direction while enclosing the other.

A preferred embodiment has the special feature that the first passage has a form narrowing toward the outside relative to the cartridge. A foam formation of  
10 very high quality can hereby be realized.

This latter embodiment preferably has the special feature that the first passage has a length of  $(3 \pm 1)$  mm, an entry diameter of  $(0.9 \pm 0.2)$  mm and an exit diameter of  $(0.25 \pm 0.05)$  mm.

15 Attention is drawn to the fact that the effective passageway of the second passage is not very critical. In general it can even be stated that a snap connection is not at all gas-tight, while the described embodiment, wherein the peripheral zone and/or the edge  
20 zone is compressed in axial direction, also ensures an adequate passage of gas.

It is known to use an insert piece which is manufactured for instance from plastic and provided with a passage and which is for instance placed in snapping  
25 co-action with an aperture of the cartridge. Such an insert piece can serve to define the first or the second passage. According to the invention the necessity of arranging a defined second passage becomes wholly superfluous. This also implies that it is unnecessary to  
30 arrange an insert piece of the described type. Use can be made, if desired, of such a known insert piece for the second passage. The invention does not relate per se thereto.

However, in order here also to be able to  
35 wholly dispense with extra components, according to the invention a particular embodiment can have the special feature that the first passage is formed by perforation.

The described embodiment, wherein the first passage has a form narrowing toward the outside, can advantageously display the feature that the first passage is made by perforating with a bradawl having a conical tip.

The embodiment in which the first passage complies with the above stated dimensioning specification can be made in the manner described with a bradawl with conical tip. This embodiment then has the special feature that the tip of the bradawl has a shape corresponding with the shape of the passage and is displaced relative to the end wall of the cartridge over an axial distance corresponding with the desired shape of the passage.

In order to enable easy transport of the prefabricated cartridges in mutually stacked layers, the embodiment is recommended in which the exit of the first passage does not protrude axially beyond the peripheral edge of the end wall.

Particularly in an embodiment in which the first passage extends over a certain axial length, a preferred embodiment has the special feature that the end wall has a recess.

The beer container according to the invention preferably has the feature that the cartridge consists substantially of the same material as the container. This embodiment has the advantage of being easily recyclable because it consists substantially of one material, with the exception of course of possible lacquer layers, printing and the like. In addition, galvanic effects are avoided, whereby metal ions could enter into solution and could affect the flavour of the beer.

Also in order to prevent this latter phenomenon a variant can display the feature that at least a part of the inner surface of the container and the surfaces of the cartridge are provided with a coating, for instance a lacquer coat. This lacquer coat can be applied in advance. Use can also be made of electro-coating.

The invention will now be elucidated with reference to the annexed drawings, wherein:

figure 1 shows a partly broken away perspective view of a beer container of the prior art;

5 figure 2 shows a sectional perspective view of a detail of a beer container according to the invention in a production stage;

figure 3 shows a view corresponding with figure 2 of the final stage;

10 figure 4 shows the detail IV as according to figure 2;

figure 5 is a view corresponding with figure 2 of a second embodiment in the production stage;

15 figure 6 is a view corresponding with figure 3 of the final stage of the second embodiment;

figure 7 is a view corresponding with figures 3 and 6 of a third embodiment;

figures 8, 9, 10 and 11 show in cross section four successive production stages of a gas cartridge; and

20 figure 12 is a view corresponding with figure 7 of a variant.

Figure 1 shows an aluminium container 1 for beer 2. The container comprises an at least partly cylindrical wall 3, a concave base 4 which is formed integrally with wall 3 and is connected thereto via a conical part 5. The container further comprises a cover 6 which, after filling of container 1 with beer 2, is connected to wall 3 over the whole periphery on the side remote from base 4. The cover comprises an opening 8 for opening by means of a pull tab 7. An aluminium cartridge 9 is fixed to the base 4 by means of a glue layer (not shown). This cartridge 9 is provided with two bushes with narrow passage extending through the cartridge wall. The first bush 10 is arranged in the end wall 11 remote from the base 4 in a recessed part 12 of this end wall 11. A second bush 13 which is identical to the first bush 10 is situated on the underside of cartridge 9 in a constricted part 14 forming the transition between peripheral wall 15

and the lower edge 16 which is glued fixedly to the base 4.

In the situation shown in figure 1 the can 1 has been closed shortly before by the cover 6. Prior to this closure a drop 17 of liquid nitrogen was introduced, immediately after which the can was closed. As described above, a part of the available nitrogen, which places the can under pressure by evaporation, is taken up into the gas cartridge 9.

Figure 2 shows a preliminary stage in the manufacture of a first embodiment of a container according to the invention.

The base 18 of a preformed container 19 has an axially displaced central part 20 which is joined via an undercut edge 21 to the rest of the base 18.

A preformed gas cartridge 22 has a constricted lower edge 23. In the situation shown in figure 2 in which the lower edge 23 is placed on the central part 20, an axial pressure force is exerted on the undercut edge 21 by co-acting annular tools 24 and 25 as according to arrows 26 and 27 respectively. The edge 21 is hereby compressed into the shape shown in figure 3, wherein the free end portion 28 of the constricted lower edge 23 is enclosed by the now compressed undercut bottom edge 21.

Figure 4 shows a nylon bush 29 which is received as according to figure 2 in the recessed part 12 of end wall 11 of cartridge 22. The plastic bush 29 has a peripheral groove 30 into which fit the edges of a hole arranged in the recessed part 12. The length 31 of the passage 32 amounts to 3 mm, while the entry diameter 33 amounts to 0.9 mm and the exit diameter 34 to 0.25 mm.

Figure 5 shows a second embodiment. A preformed cartridge 35 is provided with a constricted lower edge 36, the free end portion of which has a beaded edge 37. The tools 24 and 25 can be the same as in figure 2.

Figure 6 shows the final stage in which both the undercut edge 21 of the can base 18 and the beaded edge 37 are axially compressed. The compressed beaded



edge 37 is enclosed by the compressed edge 21 whereby the cartridge 35 is fixed to base 18.

Attention is drawn to the fact that due to the operations shown in figures 2 and 5 the coupling between the co-acting edges is not clearance-free. It is precisely this remaining clearance or space between the co-acting surfaces which forms the basis of this aspect of the invention, in that this clearance renders superfluous the use of the second bush 13 according to figure 1 or other passage manufactured during a separate operation in the end of the gas cartridge directed toward the base 18.

Figure 7 shows a variant. In this embodiment use is made of the same cartridge 35 as in figure 5. The base 38 of a container 39 has a central part 40 in recessed position which connects via an undercut edge 41 to the rest of the base 38. The dimensioning of the undercut edge 41 is such that the beaded edge 37 can only pass over the undercut edge 41 by exerting a certain axial force (indicated with arrows 42, 43) such that the beaded edge 37 is accommodated in the undercut portion of this edge 41. The final situation obtained is shown in figure 7. Even more than in the embodiment according to figures 3 and 6 is it the case that in this embodiment the coupling between edge 41 and beaded edge 37 is not gas-tight and enables passage of nitrogen to the interior of the cartridge 35.

Figures 8, 9, 10 and 11 show a production method for a gas cartridge 44 (see figure 11) which functionally corresponds with the gas cartridge 22 according to figure 2. The difference from gas cartridge 22 lies in the manufacture of the passage 45, the form of which can correspond virtually exactly with the form of the passage 32 according to figure 4.

As starting point for the manufacture of cartridge 44 use is made of an aluminium beaker 46 (see figure 8).

As shown in figure 9, the beaker 46 is placed on a supporting tool 49 which serves as anvil and can co-

act with a correspondingly formed stamping tool 50 to form a recessed central part 51 in the end wall 48. While the stamp 50 is still pressing the recess 51 against the anvil 49 a perforating operation takes place by axially displacing according to arrow 52 a bradawl 53 with a sharp tip 54, the top angle of which corresponds with the angle of the passage 32 as according to figure 4. The shape of a conical cavity 55 in stamping tool 50 corresponds with the shape of the tip 54 and with the dimensioning of passage 32 according to figure 4.

After retracting the stamping tool 50 the thus formed cartridge 46' can be removed from the supporting tool 49. The obtained form is shown in figure 10. It can be seen clearly that the passage 45 is roughly in the middle of the central recessed part 51. it is noted that the exit 56 of passage 45 is situated below the principal plane of end wall 48'. The cartridges 44 can hereby easily be stacked on one another for transport purposes.

In a final operation the constricted lower edge 23 is arranged.

Finally, figure 12 shows a base 57 of a container 58 having a central part 59 displaced axially inward. It is pointed out in this respect that the recesses 20 and 40 were displaced in the above described embodiments. The central part 59 connects onto the rest of the base 57 via an undercut edge 60. The dimensioning of the constricted lower edge 23 of cartridge 22 is such that it can be placed in snapping manner over the undercut edge 60. This embodiment corresponds in this sense with the variant shown in figure 7.

Attention is drawn to the fact that further variants are also possible within the scope of the invention. Snap connections and clamp connections can for instance be used, sharp end edges and beaded edges can be applied, bulges can extend outward and inward, beaded edges can be situated on the outside and inside and sharp edges can also be situated both on the inside and outside. The invention is further not limited to specific

materials. Particularly aluminium and steel cans are possible. These cans can be provided in any production stage, and also in advance, with coatings, for instance lacquer coats or layers applied by galvanic means.

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## CLAIMS

1. Metal container for beer comprising:  
a wall formed into a closed contour;  
a base which is connected along its whole  
periphery to this wall;  
5 optionally a cover which is arranged on the  
side remote from the base after filling of the container  
with beer and which is connected along its whole  
periphery to this wall; and  
a cartridge which is coupled to the base and  
10 extends from the base over some axial distance and which  
defines two passages, the first of which is situated in  
an end wall of the cartridge remote from the base and the  
second of which is situated in the region of the base;  
which cartridge has the general shape of a  
15 beaker, which beaker is coupled with the edge zone of its  
mouth to the base of the container by means of coupling  
means;  
characterized in that  
the coupling means are exclusively mechanical  
20 and are embodied such that between the edge zone of the  
cartridge and the base of the container there remains  
some space, which space defines the second passage.
2. Container as claimed in claim 1,  
characterized in that  
25 the base has an axially displaced part with an  
at least partly undercut peripheral zone; and  
the edge zone takes an at least partly undercut  
form;  
which peripheral zone and which edge zone  
30 mutually engage while retaining a clearance such that the  
cartridge is coupled to the base.
3. Container as claimed in claim 2,  
characterized in that  
the coupling means comprise snap means.

4. Container as claimed in claim 2,  
characterized in that

at least one of the peripheral zone and the  
edge zone is compressed at least partially in axial  
5 direction while enclosing the other.

5. Container as claimed in claim 1,  
characterized in that

the first passage has a form narrowing toward  
the outside relative to the cartridge.

10 6. Container as claimed in claim 5,  
characterized in that

the first passage has a length of  $(3 \pm 1)$  mm,  
an entry diameter of  $(0.9 \pm 0.2)$  mm and an exit diameter  
of  $(0.25 \pm 0.05)$  mm.

15 7. Container as claimed in claim 1,  
characterized in that

the first passage is formed by perforation.

8. Container as claimed in claim 5,  
characterized in that

20 the first passage is made by perforating with a  
bradawl having a conical tip.

9. Container as claimed in claims 6 and 8,  
characterized in that

the tip of the bradawl has a shape  
25 corresponding with the shape of the passage and is  
displaced relative to the end wall of the cartridge over  
an axial distance corresponding with the desired shape of  
the passage.

10. Container as claimed in claim 1,  
30 characterized in that

the exit of the first passage does not protrude  
axially beyond the peripheral edge of the end wall.

11. container as claimed in claim 10,  
characterized in that

35 the end wall has a recess.

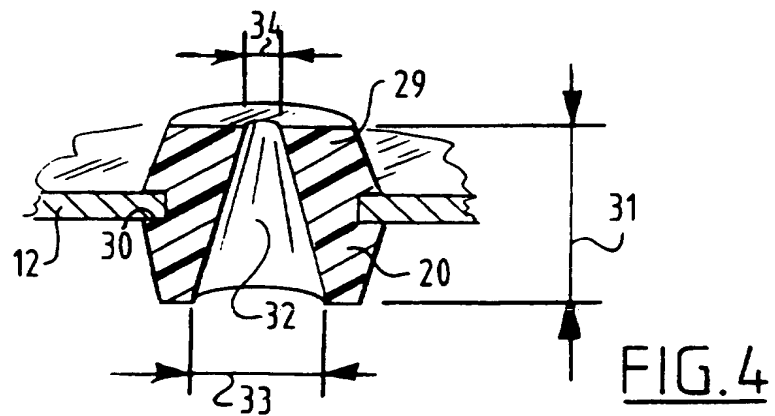
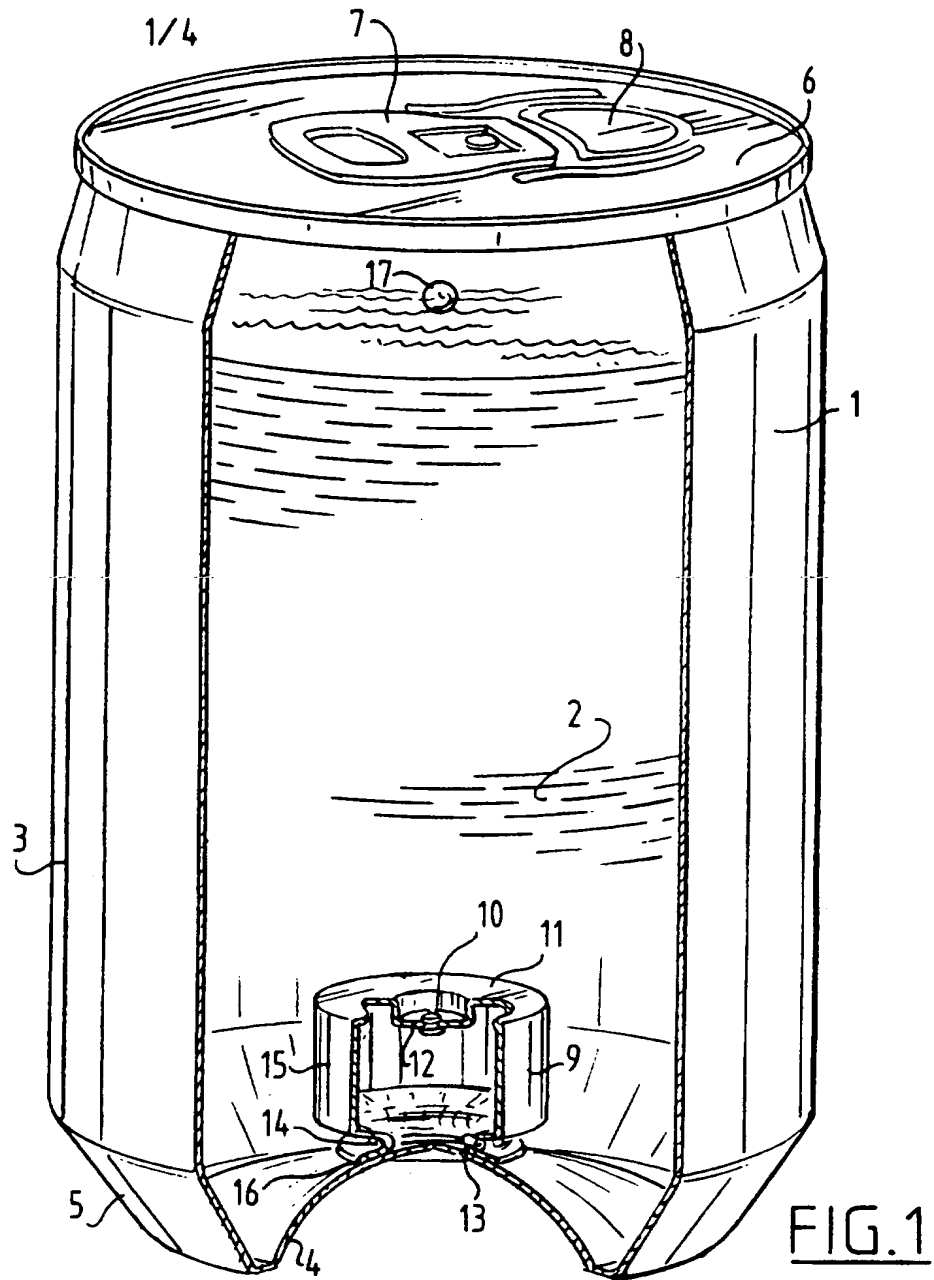
12. Container as claimed in claim 1,  
characterized in that

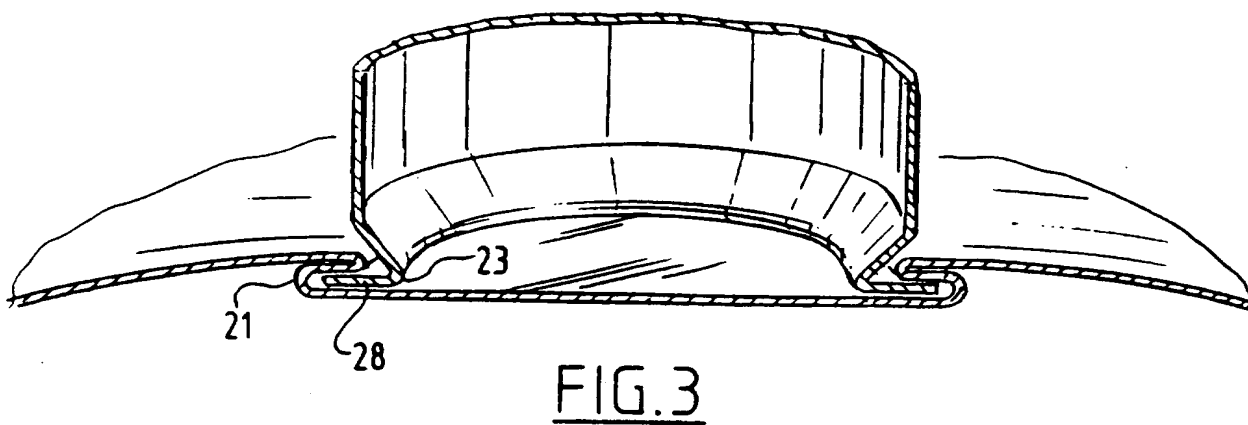
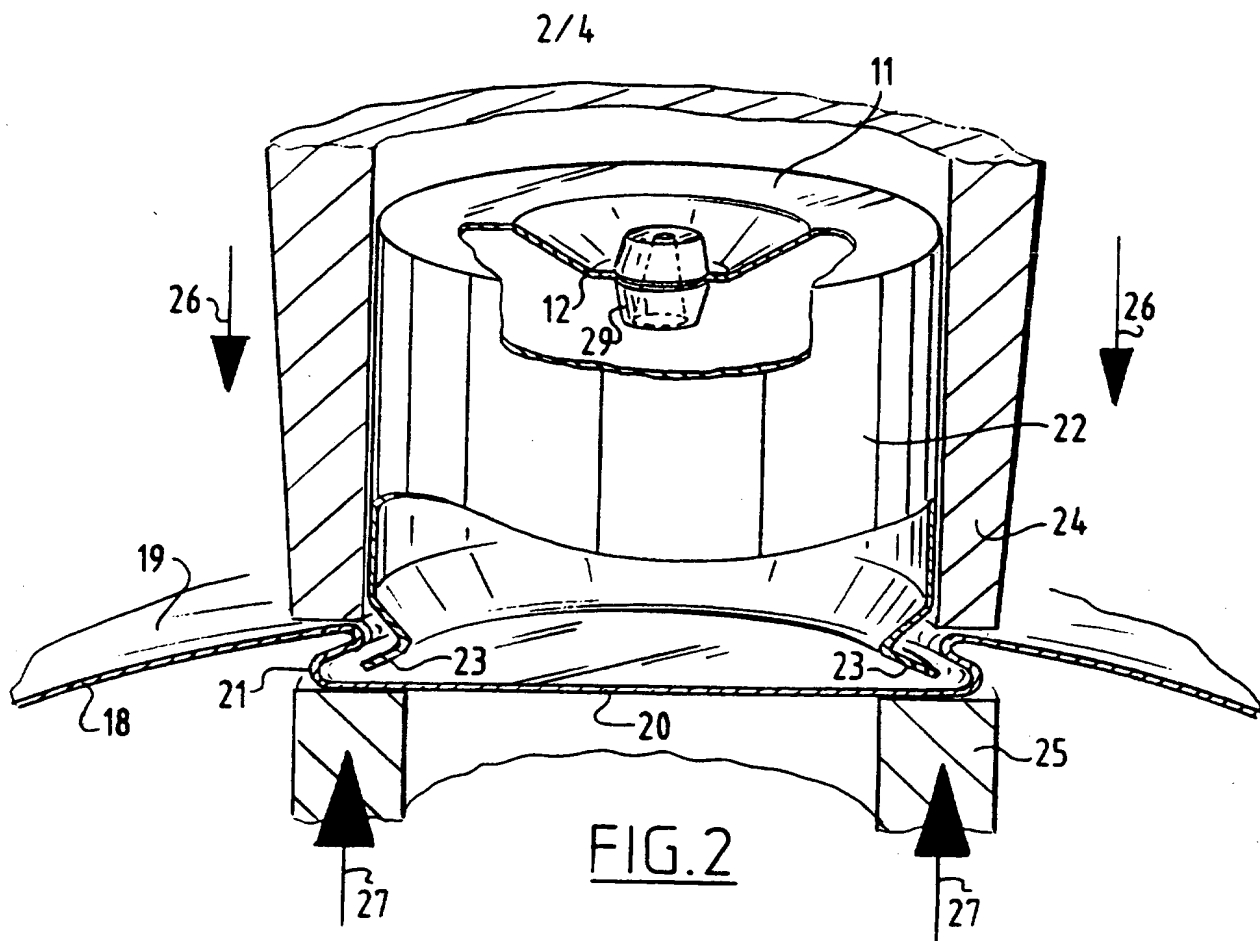
the cartridge consists substantially of the same material as the container.

13. Container as claimed in claim 1, characteriz d in that

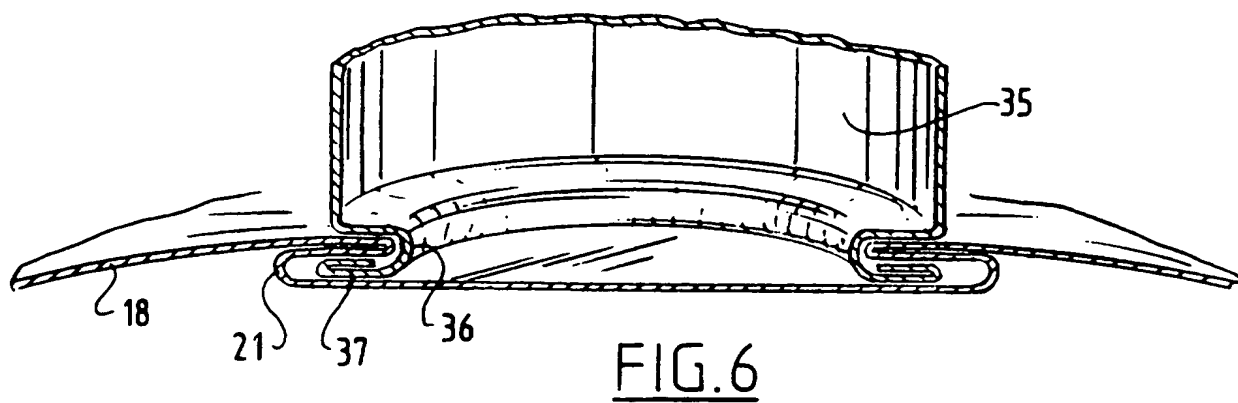
- 5 at least a part of the inner surface of the container and the surfaces of the cartridge are provided with a coating, for instance a lacquer coat.

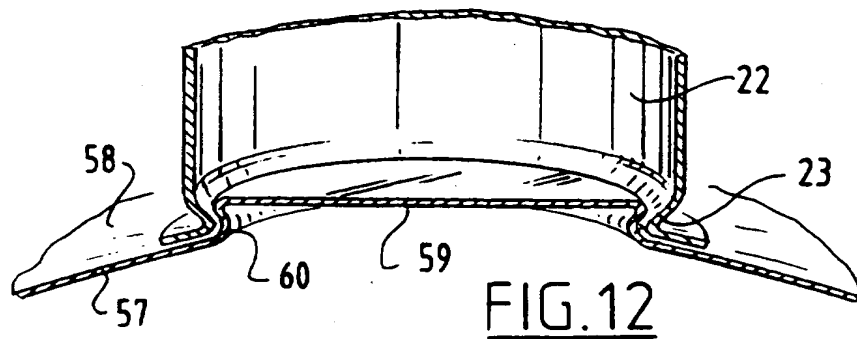
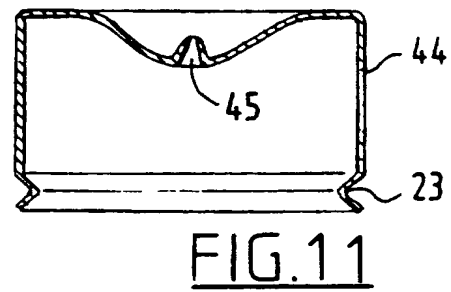
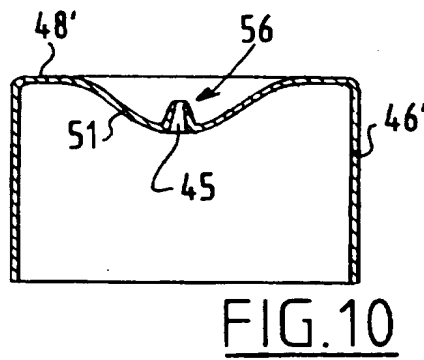
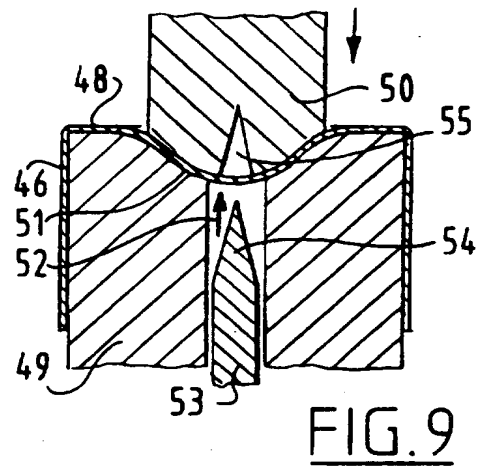
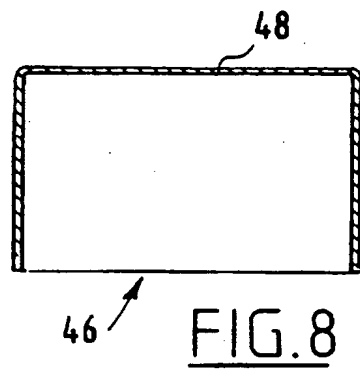
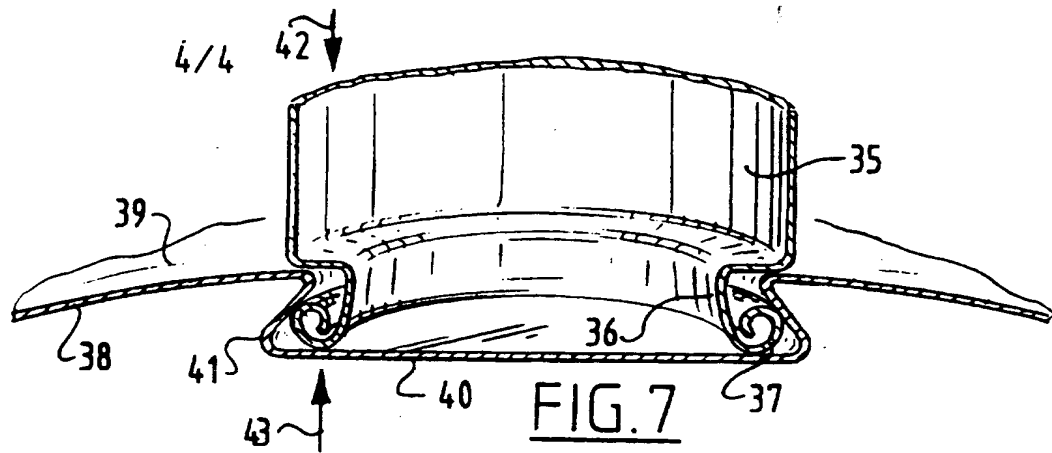
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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 96/00142

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D79/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO,A,95 08493 (BASS PLC) 30 March 1995 see page 16, line 13 - page 23, line 1 see page 23, line 22 - page 24, line 6; figures 1-13,15-17 ---	1,5-13
A	WO,A,91 13006 (E.J. PRICE) 5 September 1991 see the whole document ---	1
A	GB,A,1 331 425 (METAL BOX CY LTD) 26 September 1973 see the whole document -----	1

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

31 July 1996

Date of mailing of the international search report

- 9. 08. 96

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